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Taxonomic revision of *Ectyphus* Gerstaecker, 1868 and *Parectyphus* Hesse, 1972 with a key to world Ectyphinae (Insecta, Diptera, Mydidae)

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Abstract

The Afrotropical Mydidae genera *Ectyphus* Gerstaecker, 1868 and *Parectyphus* Hesse, 1972 are revised. Six species of *Ectyphus* are recognised (*E. abdominalis* Bezzi, 1924, *E. armipes* Bezzi, 1924, *E. capillatus* Hesse, 1969, *E. pinguis* Gerstaecker, 1868, and *E. pretoriensis* Bezzi, 1924), of which one is newly described from Kenya, *E. amboseli* **sp. n.** Two species, *E. bitaeniatus* Hesse, 1969 and *E. flavidorsalis* Hesse, 1969, are newly synonymised with *E. pinguis*. The monotypic genus *Parectyphus* Hesse, 1972 and the male of its type species *P. namibiensis* Hesse, 1972 are re-described while the female is described for the first time. Comments on the distribution of all species within biodiversity hotspots are given. A dichotomous identification key to the genera and species of world Ectyphinae is provided and illustrated keys to the world Ectyphinae are made available online in both dichotomous and multi-access, matrix-based formats.

Keywords

Mydidae, Ectyphinae, Afrotropical, *Ectyphus*, *Parectyphus*, world key

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Introduction

Mydidae is one of the smaller families of Diptera, with 471 species currently described in 66 genera world-wide. Mydids are infrequently collected, so little is known about the life history and seasonality of these interesting flies. Current knowledge of the Mydidae fauna indicates that most of the species diversity occurs in the Afrotropical Region, specifically in Namibia and western South Africa. To this day, the subfamily Ectyphinae is represented by two groups of geographically isolated genera: *Heteromydas* Hardy, 1944 and *Opomydas* Curran, 1934 from western North America (Mexico: Baja California Norte, Baja California Sur, Sonora and the USA: Arizona, California, Nevada, New Mexico, Texas), and *Ectyphus* Gerstaecker, 1868 and *Parectyphus* Hesse, 1972 from southern Africa (Namibia and South Africa). The objective of this study is the revision of the two Afrotropical genera, including the description of the first species to be collected in eastern Africa (Fig. 1). The revision of *Ectyphus* and *Parectyphus* is based on 131 and 11 specimens, respectively, entails the presentation of identification keys and descriptions of all species of the two genera, and summarises what is known about their biology and distribution. In addition, keys for the identification of all known genera and species are provided. For regularly updated distribution maps for all Mydidae species based on specimen occurrence data see http://www.mydidae.tdvia.de/mydidae_specimen_map.

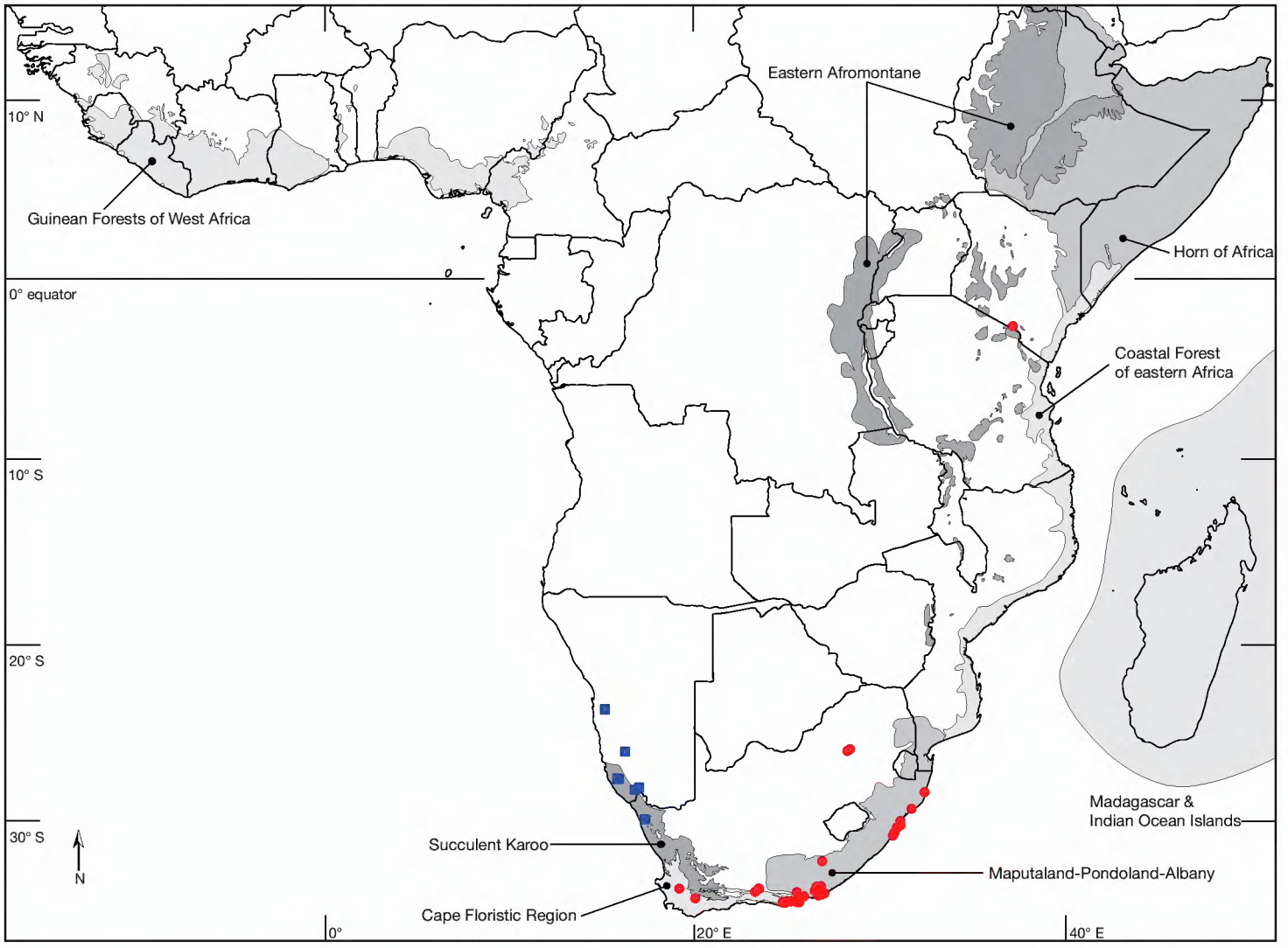

Figure 1. Map of the Afrotropical Region with biodiversity hotspots *sensu* Conservation International showing distribution of *Ectyphus* (red circles) and *Parectyphus* (blue squares). Note the distribution of *Ectyphus* in south-eastern Kenya.

Taxonomic history of *Ectyphus* and *Parectyphus*

Gerstaecker (1868) erected the genus *Ectyphus* and described the type species *E. pinguis* from ‚Africa australis'. His diagnosis of the genus was based on the presence of a small ‚posterior crossvein' (= M_3+CuA_1) on the wing, a circlet of spurs on the female ovipositor (acanthophorite spurs), and a reduced, rudimentary proboscis. These characters are not autapomorphies for *Ectyphus,* but are also found in genera of other subfamily taxa.

Williston (1886, 1898) described *E. limbatus* Williston, 1886 from Arizona and *E. townsendi* Williston, 1898 from New Mexico, USA, and Séguy (1928) described *E. athamas* from 'Basse California' (= Lower California) in present-day Baja California Norte state, Mexico. Bezzi (1924), when studying the southern African Mydidae, suggested that the North American *Ectyphus* belong to a separate genus based on the lack of a metathoracic tibial spine in females. Curran (1934) then erected the genus *Opomydas* to include these North American species, leaving only African species in *Ectyphus*. Kondratieff and Fitzgerald (1996) provide a recent revision of the North American species.

Bezzi (1924) described two new South African species of *Ectyphus*, *i.e.*, *E. abdominalis* from Montagu (Western Cape) and *E. armipes* from Stellabush (KwaZulu-Natal), as well as the subspecies *E. armipes pretoriensis* from Pretoria (Gauteng). Hesse (1969) re-described *Ectyphus* with the addition of three new South African species all from the Eastern Cape: *E. bitaeniatus* from Resolution, *E. capillatus* from Brakkloof, and *E. flavidorsalis* from Willowmore. Also described were three varieties of *E. pinguis*: *litoralis* from the coastal Eastern Cape, and *ceramiiformis* and *karooensis* from Willowmore and surroundings. Hesse (1969) established *E. armipes pretoriensis* as a distinct species *E. pretoriensis*. Interestingly, *E. capillatus* was described only from two male specimens, *E. flavidorsalis* from two female specimens, and *E. bitaeniatus* from a single female. The status of the species and varieties described by Hesse (1969) is discussed below.

In 1972, Hesse described a new genus, *Parectyphus* from a single male specimen collected in Gobabeb, Erongo, Namibia. Illustrations of the antennae and hypopygium of the type species *P. namibiensis* Hesse, 1972 were provided. He postulated that *Parectyphus* was closely related to *Ectyphus* based on similar morphology, with one major difference being the elongation of the ‚stump vein' extending from wing vein R_4 to connect with R_{2+3}. Bowden (1980) catalogued 7 species for *Ectyphus*, *E. abdominalis*, *E. armipes*, *E. bitaeniatus*, *E. capillatus*, *E. flavidorsalis*, *E. pinguis*, and *E. pretoriensis*, and 1 species for *Parectyphus*, *P. namibiensis*.

Based on morphological similarity among *Ectyphus*, *Opomydas*, and the North American genus *Heteromydas*, Wilcox and Papavero (1971) erected the subfamily Ectyphinae. The taxon was based primarily on characters of the male terminalia: a free hypandrium, an aedeagus with a single tube, and ‚dististyli' on the gonocoxites. The term ‚dististyli' suggests that these novel appendages are gonostyli, which are absent in Mydidae (van Emden and Hennig 1970, Yeates and Irwin 1996, Dikow 2009). We, therefore, propose the term palp-like lateral appendage *sensu* Hesse (1969) to replace this term. Other characters diagnostic of Ectyphinae are the presence of macrosetae

on the median surface of the metathoracic trochanters and metathoracic tarsomere 1 about five times as long as broad. Wilcox and Papavero (1971) list the Oriental Region along with the south-western USA, northern Mexico, and southern Africa as being inhabited by Ectyphinae, but later (Papavero and Wilcox 1974) the authors did not include this particular record from Asia. The genus *Parectyphus* was classified as *incertae sedis* by Papavero and Wilcox (1974) in their comprehensive study of the world Mydidae, but Bowden (1980), in the Catalogue of the Diptera of the Afrotropical Region, placed it within Ectyphinae.

Materials and methods

Morphological terminology follows the Manual of Nearctic Diptera (McAlpine 1981) and Dikow (2009). Abdominal tergites and sternites are referred to as ‚T' and ‚S' respectively. The terms prothoracic, mesothoracic, and metathoracic are abbreviated 'pro', 'mes', and 'met', respectively. The term pubescence (adjective ‚pubescent') refers to the short, fine microtrichia densely covering certain body parts. Other generalised terms refer to the Torre-Bueno Glossary of Entomology (Nichols 1989).

Species descriptions are based on all available specimens. Well-preserved specimens exhibiting intraspecific variation were selected for description. The descriptions are compiled from a character matrix of 145 features assembled with Lucid Builder (v.3.5) and exported as natural language descriptions. When available, species are fully described in the male sex while females are only described with those features that differ (except for characters relating to the terminalia/genitalia). All specimens examined were dry-mounted on pins. Regarding the specimens selected for dissection, the female genitalia and male terminalia were excised and macerated in 10% potassium hydroxide at 55°C and rinsed in distilled H_2O. The terminalia were stored in 70% ethanol for examination and illustration, but permanently stored in 100% glycerine. Morphological features were illustrated using a *camera lucida* on a Leica stereo-microscope and digitally re-drawn in Adobe Illustrator®. The vestiture/setation of the male terminalia was not illustrated. Wing length was measured from the tegula to the apex of the wing. Photographs of the specimens were taken using a Microptics ML Macro XLT digital system with a Canon EOS 40D camera. All photographs were deposited in Morphbank (http://www.morphbank.net) and permanent links to the full-size images are included in the figure captions.

In recording data for type specimens as well as non-type specimens, information is given (where available) in a standard manner, *i.e.*, locality, geographic co-ordinates, elevation, date of collection (month indicated in lower case Roman numerals where hyphens indicate missing entries for day, month, year), habitat information, collector, and depository. Female (♀) and male (♂) symbols indicate the sex while a question mark (?) refers to specimens of indeterminable sex (*i.e.*, with broken or missing abdomen). Each specimen (other than type specimens of already described species, which are sufficiently identified by their type status), is listed with a unique AAM specimen

number that is attached as a white label and will allow the re-investigation as well as provide a unique identifier (LSID http://lsids.sourceforge.net) in databases like GBIF (http://www.gbif.org) in the future. AAM is an abbreviation for 'Apioceridae Asilidae Mydidae' and identifies a record in the specimen database used by T. Dikow in this format: AAM-000000. The distribution of all studied specimens is illustrated in distribution maps created in ArcMap (v.9). The electronic shape-files of the Biodiversity Hotspots were obtained from Conservation International (2005). The electronic keys were deposited in the IdentifyLife (http://www.identifylife.org) project.

Institutions providing specimens are listed below, along with the abbreviations used in the text and the people who kindly assisted: AMGS - Albany Museum, Grahamstown, Eastern Cape, South Africa (A. Kirk-Spriggs, S. Gess); BMNH - The Natural History Museum, London, UK (E. McAlister,); CAS - California Academy of Sciences, San Francisco, California, USA (C. Griswold); CNC - Canadian National Collection of Insects, Arachnids and Nematodes, Ottawa, Ontario, Canada (J. Skevington); DEIC - Senckenberg Deutsches Entomologisches Institut, Müncheberg, Brandenburg, Germany (F. Menzel); ISNB - Institut Royal des Sciences Naturelles de Belgique, Brussels, Belgium (P. Grootaert); MNHN - Museum national d'Histoire naturelle, Paris, France (C. Daugeron, E. Delfosse); MZLU - Museum of Zoology, Lund University, Lund, Sweden (R. Danielsson); NMNW - National Museum of Namibia, Windhoek, Namibia (A. Kirk-Spriggs); NMSA - Natal Museum, Pietermaritzburg, KwaZulu-Natal, South Africa (B. Muller, M. Mostovski); SAMC - South African Museum, Cape Town, Western Cape, South Africa (M. Cochrane); SANC - South African National Collection of Insects, Pretoria, Gauteng, South Africa (R. Urban); SMNS - Staatliches Museum für Naturkunde, Stuttgart, Baden-Württemberg, Germany (H.-P. Tschorsnig); USNM - United States National Museum, Smithsonian Institution, Washington, DC, USA (F.C. Thompson); ZMHB - Museum für Naturkunde, Berlin, Germany (J. Ziegler, J. Pohl); ZSMC - Zoologische Staatssammlung, München, Bayern, Germany (M. Kotrba).

Taxonomy

Genus *Ectyphus* Gerstaecker, 1868

Ectyphus Gerstaecker 1868: 92. Type species: *Ectyphus pinguis* Gerstaecker 1868, by monotypy.

Diagnosis: *Ectyphus* is distinguished from other Afrotropical Mydidae by the distinctly clubbed metathoracic femur, the presence of a ventral keel on the metathoracic tibia terminating into a well-developed apical spine, and veins M_3+CuA_1 terminate together into C on the posterior wing margin. Other features include the presence of 3 spermathecae in females and a free, square, and more or less flat hypandrium in males.

Ectyphus abdominalis Bezzi, 1924

Figs 2, 45

Ectyphus abdominalis Bezzi 1924: 198; Hesse 1969: 378; Bowden 1980: 326.

Diagnosis: The species is distinguished from congeners by the broad, reddish stripe covering most of the dorsal abdomen (Fig. 2), the light brown setation on the head and scutum, the lack of a yellow posterior margin on the abdominal tergites, and its apparent distribution in the western Western Cape Province.

Re-description female: Head: brown, facial gibbosity yellow, in general white pubescent; width distinctly greater than thorax, interocular distance on vertex larger than at ventral eye margin, vertex between compound eyes slightly depressed, parafacial area very narrow, facial gibbosity nearly touching median eye margin; facial gibbosity distinct, well-developed and discernible in lateral view; mystax light brown, covering entire facial gibbosity; frons predominantly white pubescent (only narrow median area apubescent), vertex entirely white pubescent, postgena white pubescent; setation: vertex light brown, frons light brown, ocp setae brown, pocl setae brown; ocellar triangle apubescent; proboscis brown, short, about ½ length of oral cavity; labellum small, as wide as prementum, about ½ length of prementum, unsclerotised laterally; maxillary palpus cylindrical, light brown, longer than ½ length of proboscis.

Antenna: brown, scape and pedicel brown setose dorsally and ventrally; postpedicel cylindrical in proximal ½, symmetrically bulbous in distal ½, ≥ 5.0 times as long as combined length of scape and pedicel; apical ‚seta-like' sensory element situated apically in cavity on postpedicel.

Thorax: brown, predominantly yellow pubescent; scutum medially bluish-black, laterally brown, surface entirely smooth, lightly grey pubescent, scutal setation comprised of distinct rows of short dorsocentral setae and lateral scutal setae; dc setae pre- and postsuturally light brown, acr setae absent, lateral scutal setae brown, npl, spal, and pal setae absent; postpronotal lobe light brown, partly silver pubescent; proepisternum, lateral postpronotum, and postpronotal lobe long brown setose; scutellum entirely silver pubescent, short brown setose, apical scutellar setae absent; mesopostnotum, anatergite, and katatergite grey pubescent, asetose; katatergite elevated and smoothly convex; anterior anepisternum asetose, supero-posterior anepisternum asetose; posterior anepimeron long white setose, katepimeron asetose; metepimeron evenly elevated, same colour as T1, silver pubescent, asetose; metepisternum silver pubescent, asetose.

Leg: brown, setation predominantly white; pro, mes, and met coxa grey pubescent, white setose; met trochanter macrosetose medially; femur brown, met femur evenly clubbed in distal ¾, in distal ½ macrosetose, 1 antero-ventral and 1 postero-ventral row of macrosetae; pro, mes, and met tibia straight, met tibia cylindrical with distinct ventral keel terminating into a sharp spine; pro and mes tarsomere 1 as long as combined length of tarsomeres 2–3, pulvillus well-developed, as long as well-developed claw, and as wide as base of claw; empodium absent.

Figures 2–5. Photographs of *Ectyphus* species. **2** *E. abdominalis* (♀ holotype, SAMC, Morphbank); **3–4** *E. amboseli* sp. n. (♂ holotype, AAM-000191, CAS) **3** dorsal (Morphbank) **4** lateral (Morphbank) **5** *E. armipes* (♂ holotype, SAMC, Morphbank). Scale lines = 5 mm.

Wing: length = 13.2 mm; hyaline throughout, slightly brown stained along veins, veins light brown, microtrichia absent; cells r_1, r_4, r_5, m_3, + cu*p* closed; C well-developed, around entire wing; R_4 terminates in R_1; R_5 terminates in R_1; stump vein (R_3) at base of R_4 present, long but not reaching R_2; R_4 and R_5 widest apart medially; r-m distinct, R_{4+5} and M_1 apart, connected by crossvein; M_1 straight at r-m (not curving anteriorly), M_1 (or M_1+M_2) terminates in C; CuA_1 and CuA_2 split proximally to m-cu (cell m_3 narrow proximally); M_3+CuA_1 terminate together in C; A_1 undulating, cell a_1 wide, A_1 and wing margin further apart proximally than distally; alula well-developed; halter brown.

Abdomen: brown and yellow; setation comprised of sparsely scattered short brown setae, surface entirely smooth; T1 brown, T2 brown with yellow anterior and posterior margin, T3–7 brown laterally and yellow medially; T1–3 sparsely brown setose; T predominantly apubescent; S1–7 light brown; S1–3 asetose; S predominantly apubescent; T2–4 parallel-sided and not constricted waist-like; bullae on T2 black, transversely elongate, surface entirely smooth, T2 surface anterior to bullae smooth.

Female genitalia: densely arranged anteriorly directed setae absent, only few on T7–8 and S7–8; T10 divided into 2 heavily sclerotised acanthophorite plates. Specimen not further dissected to preserve the unique, already damaged holotype.

Re-description male: male unknown.

Material examined: South Africa: Western Cape Province: 1♀ Montagu, 33°47'12"S 20°06'42"E, -.i.1876, R. Turner (holotype, SAMC).

Type locality, distribution, and biodiversity hotspot: Montagu (33°47'12"S 20°06'42"E), Western Cape, South Africa. Cape Floristic Region biodiversity hotspot.

Remarks: Although we were able to study some 131 specimens of *Ectyphus*, many of them new records since the last review by Hesse (1969), we were unable to identify any additional specimen of *E. abdominalis*. The unique female holotype is in poor condition and originates from a unique locality from where no other *Ectyphus* have ever been collected (Fig. 45). It is possible that this species represents another junior synonym of *E. pinguis* as this species, which is primarily known from the Eastern Cape, occurs even further west in the Western Cape than the type locality of *E. abdominalis* (see Remarks under *E. pinguis*). Only when male specimens from the type locality become available can the status of this species be confirmed.

Ectyphus amboseli sp. n.

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Figs 1, 3–4, 11–13

Etymology: Noun in apposition that refers to the type locality Amboseli Lodge, Kenya.

Diagnosis: The species is distinguished from congeners by the yellow colour and pubescence of the thorax (Fig. 3), the yellow abdominal sternites (Fig. 3), and its apparent distribution in Kenya (Fig. 1).

Description male: Head: brown, facial gibbosity yellow, in general grey pubescent; width distinctly greater than thorax, interocular distance on vertex larger than at ventral eye margin, vertex between compound eyes slightly depressed, parafacial area very narrow, facial gibbosity nearly touching median eye margin; facial gibbosity distinct, well-developed and discernible in lateral view; mystax white, covering entire facial gibbosity; frons entirely grey pubescent, vertex medially apubescent, laterally grey pubescent, postgena white pubescent; setation: vertex white, frons white, ocp setae white, pocl setae white; ocellar triangle apubescent; proboscis brown, short, about ½ length of oral cavity; labellum small, as wide as prementum, as long as prementum, unsclerotised laterally; maxillary palpus cylindrical, light brown, about ½ length of proboscis.

Antenna: brown, scape and pedicel white setose dorsally and ventrally; postpedicel cylindrical in proximal ½, symmetrically bulbous in distal ½, ≥ 6.0 times as long as combined length of scape and pedicel; apical ‚seta-like' sensory element situated apically in cavity on postpedicel.

Thorax: yellow, predominantly yellow pubescent; scutum yellow, broad brown median presutural stripe and brown paramedial postsutural stripes, surface entirely smooth, predominantly yellow pubescent, paramedial and sublateral stripes apubescent, scutal setation comprised of distinct rows of short dorsocentral setae and lateral scutal setae; dc setae pre- and postsuturally white, acr setae absent, lateral scutal setae white, npl, spal, and pal setae absent; postpronotal lobe yellow, partly white pubescent; proepisternum, lateral postpronotum, and postpronotal lobe long white setose;

scutellum apubescent, asetose medially, laterally yellow setose, apical scutellar setae absent; mesopostnotum, anatergite, and katatergite silver pubescent, asetose; katatergite elevated and smoothly convex; anterior anepisternum asetose, supero-posterior anepisternum asetose; posterior anepimeron long white setose, katepimeron asetose; metepimeron evenly elevated, same colour as T1, silver pubescent, asetose; metepisternum silver pubescent, asetose.

Leg: yellow, setation predominantly white; pro, mes, and met coxa grey pubescent, white setose; met trochanter macrosetose medially; femur yellow, met femur evenly clubbed in distal ¾, in distal ½ macrosetose, 1 antero-ventral and 1 postero-ventral row of macrosetae; pro, mes, and met tibia straight, met tibia cylindrical with distinct ventral keel terminating into a sharp spine; pro and mes tarsomere 1 longer than tarsomere 2, but less than combined length of tarsomeres 2–3, met tarsomere 1 as long as combined length of tarsomeres 2–3; pulvillus well-developed, as long as well-developed claw, and as wide as base of claw; empodium absent.

Wing: length = 9.8–10.3 mm; hyaline throughout, veins light brown, microtrichia absent; cells r_1, r_4, r_5, m_3, + cu*p* closed; C well-developed, around entire wing; R_4 terminates in R_1; R_5 terminates in R_1; stump vein (R_3) at base of R_4 present, short not reaching R_2; R_4 and R_5 widest apart medially; r-m distinct, R_{4+5} and M_1 apart, connected by crossvein; M_1 straight at r-m (not curving anteriorly), M_1 (or M_1+M_2) terminates in C; CuA_1 and CuA_2 split proximally to m-cu (cell m_3 narrow proximally); M_3+CuA_1 terminate together in C; A_1 undulating, cell a_1 wide, A_1 and wing margin further apart proximally than distally; alula well-developed; halter light yellow.

Abdomen: brown and yellow; setation comprised of scattered white setae, surface entirely smooth; T1–7 brown, yellow posterior margin; T1 long white setose, T2–T3 sparsely white setose; T predominantly apubescent; S1–7 yellow; S1 asetose, S2–3 sparsely white setose; S predominantly apubescent; T2–4 parallel-sided and not constricted waist-like; bullae on T2 black, transversely elongate, surface entirely smooth, T2 surface anterior to bullae smooth.

Male terminalia: T1–7 well-developed, entirely sclerotised, T8 postero-medially weakly sclerotised, with anterior transverse sclerotised bridge connecting lateral sclerites; T7–8 anteriorly with 2 lateral apodemes; S6 regular, without any special setation postero-medially, S8 well-developed and simple, fused to T8 dorso-laterally, entire (undivided) ventro-medially; epandrium formed by single sclerite (fused medially ± entirely), pointed postero-laterally; subepandrial sclerite without lateral or median protuberances; hypandrium ± flat, rectangular to square sclerite, entirely fused with gonocoxite, forming a gonocoxite-hypandrial complex; gonocoxite dorso-ventrally flattened in distal ½, higher in proximal ½, with palp-like lateral appendage, gonocoxal apodeme present, short (at most slightly extending hypopygium anteriorly); 1 functional aedeagal prong, aedeagal epimere absent; lateral ejaculatory process absent; ejaculatory apodeme formed by single dorso-ventrally oriented plate; ventro-median margin of dorsal aedeagal sheath heavily sclerotised (appearing entirely closed); dorsal aedeagal sheath long, sperm sac entirely covered; sperm sac appearing ± heavily sclerotised.

Description female: female unknown.

Material examined: Kenya: Rift Valley Province: 3♂ 1? Amboseli Lodge, 2°39'59"S 37°17'00"E, 28.ix.1972, W. Middlekauff (holotype AAM-000191, paratypes AAM-000190, AAM-000192–AAM-000193, CAS).

Type locality, distribution, and biodiversity hotspot: Amboseli Lodge (2°39'59"S 37°17'00"E), Kenya. Does not occur in any currently recognised biodiversity hotspot.

Ectyphus armipes Bezzi, 1924

Figs 5–6, 14–16, 45

Ectyphus armipes Bezzi 1924: 196; Hesse 1969: 381; Wilcox and Papavero 1971: 59; Bowden 1980: 326.

Diagnosis: The species is distinguished from congeners by the long proboscis that is slightly longer than the oral cavity, the large labellum that occupies nearly the entire oral cavity, brown facial gibbosity and postpronotal lobe, and the dorso-ventrally flattened 'palp-like' appendage on the gonocoxite in males.

Re-description male: black, facial gibbosity light brown, in general predominantly apubescent, yellow pubescent on median eye margin; width distinctly greater than thorax, interocular distance on vertex larger than at ventral eye margin, vertex between compound eyes slightly depressed, parafacial area very narrow, facial gibbosity nearly touching median eye margin; facial gibbosity distinct, well-developed and discernible in lateral view; mystax white, covering entire facial gibbosity, sparse; frons predominantly apubescent, vertex apubescent, postgena lightly silver pubescent; setation: vertex white, frons white, ocp setae white, pocl setae white; ocellar triangle apubescent; proboscis light brown, long, reaching fronto-clypeal suture; labellum large, much wider than prementum, longer than prementum and as long as oral cavity, unsclerotised laterally; maxillary palpus cylindrical, light brown, about ½ length of proboscis.

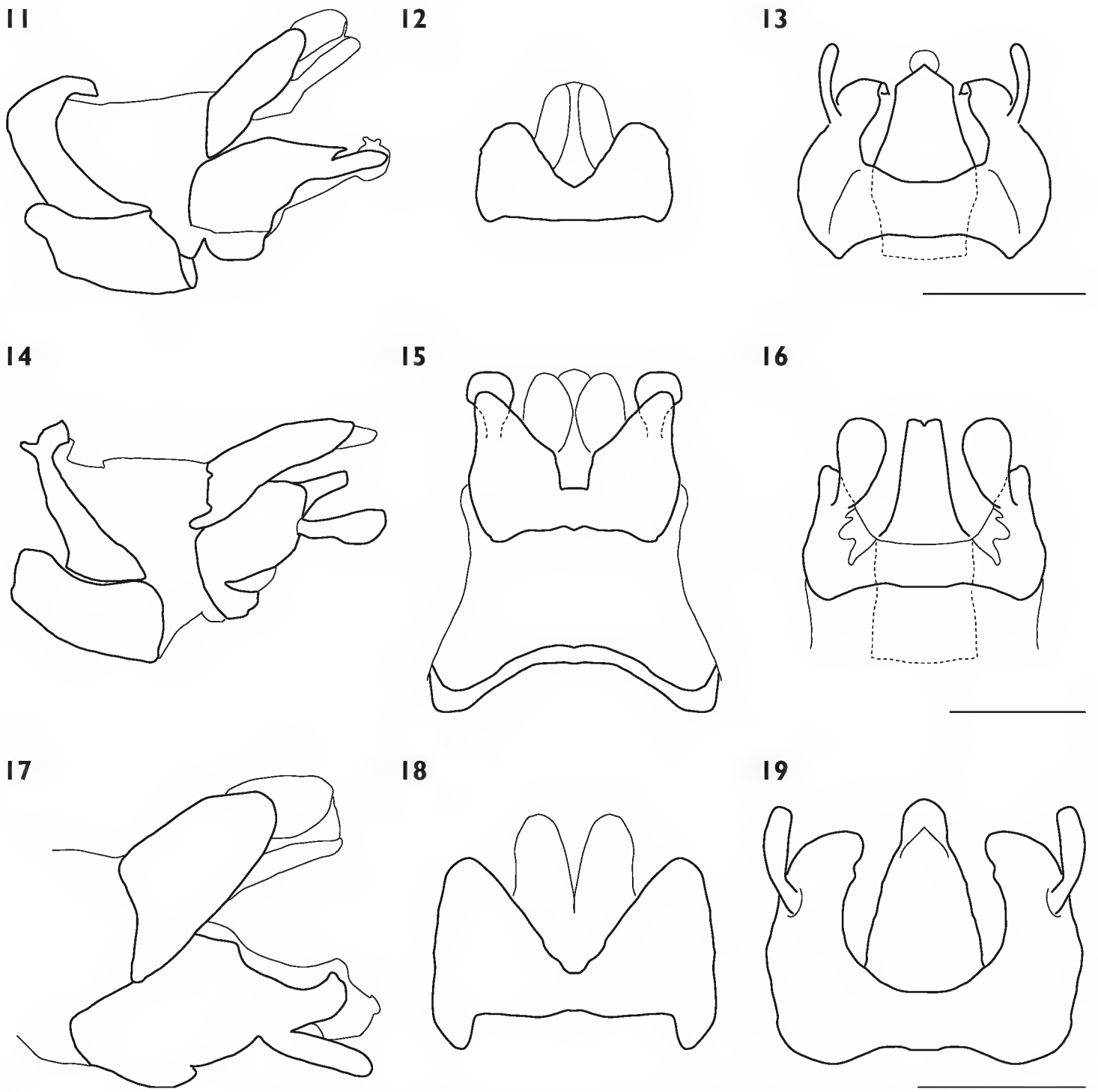
Antenna: brown, scape and pedicel white and yellow setose dorsally and ventrally; postpedicel cylindrical in proximal ½, symmetrically bulbous in distal ½, ≥ 6.0 times as long as combined length of scape and pedicel; apical ‚seta-like' sensory element situated apically in cavity on postpedicel.

Thorax: dark brown to bluish-black, predominantly apubescent; scutum medially dark brown, laterally brown, surface entirely smooth, predominantly apubescent, only extreme lateral margin grey pubescent, scutal setation comprised of distinct rows of short dorsocentral setae and lateral scutal setae; dc setae pre- and postsuturally white, acr setae absent, lateral scutal setae white, npl, spal, and pal setae absent; postpronotal lobe light brown, partly silver pubescent; proepisternum, lateral postpronotum, and postpronotal lobe long white setose; scutellum apubescent, asetose medially, laterally yellow setose, apical scutellar setae absent; mesopostnotum, anatergite, and katatergite silver pubescent, asetose; katatergite elevated and smoothly convex; anterior anepister-

Figures 6–10. Photographs of *Ectyphus* species. **6** *E. armipes* (♀ paratype, SAMC, Morphbank); **7–8** *E. capillatus* (♂, AAM-003502, AMGS) **7** dorsal (Morphbank) **8** lateral (Morphbank) **9** *E. pretoriensis* (♂ lectotype, SAMC, Morphbank) **10** *E. pretoriensis* (♀ paralectotype, SAMC, Morphbank). Scale lines = 5 mm.

num asetose, supero-posterior anepisternum asetose; posterior anepimeron long white setose, katepimeron asetose; metepimeron evenly elevated, same colour as T1, silver pubescent, asetose; metepisternum silver pubescent, asetose.

Leg: brown, setation predominantly white; pro, mes, and met coxa apubescent, long white setose; met trochanter macrosetose medially; femur brown, met femur evenly clubbed in distal ¾, in distal ½ macrosetose, 1 antero-ventral and 1 postero-ventral row of macrosetae; pro, mes, and met tibia straight, met tibia cylindrical with distinct ventral keel terminating into a sharp spine; pro and mes tarsomere 1 as long as combined length of tarsomeres 2–3, met tarsomere 1 as long as combined length of tarsomeres 2–4; pulvillus well-developed, as long as well-developed claw, and as wide as base of claw; empodium absent.



Figures 11–19. Male terminalia of *Ectyphus* species. **11–13.** *E. amboseli* sp. n. **11** lateral **12** dorsal **13** ventral; **14–16** *E. armipes* **14** lateral **15** dorsal **16** ventral; **17–19** *E. capillatus* **17** lateral **18** dorsal **19** ventral. Scale lines = 1 mm.

Wing: length = 12.2–14.1 mm; slightly brown stained, darker brown around veins, veins light brown, microtrichia absent; cells r_1, r_4, r_5, m_3, + cu*p* closed; C well-developed, around entire wing; R_4 terminates in R_1; R_5 terminates in R_1; stump vein (R_3) at base of R_4 present, long but not reaching R_2; R_4 and R_5 widest apart medially; r-m distinct, R_{4+5} and M_1 apart, connected by crossvein; M_1 straight at r-m (not curving anteriorly), M_1 (or M_1+M_2) terminates in C; CuA_1 and CuA_2 split proximally to m-cu (cell m_3 narrow proximally); M_3+CuA_1 terminate together in C; A_1 undulating, cell a_1 wide, A_1 and wing margin further apart proximally than distally; alula well-developed; halter light brown.

Abdomen: brown; setation comprised of scattered white setae, surface entirely smooth; T1 brown, T2–7 brown with yellow posterior margin; T1 long white setose,

T2–T3 sparsely white setose; T predominantly apubescent; S1–7 brown, yellow posterior margin; S1 asetose, S2–3 sparsely white setose; S predominantly apubescent; T2–4 parallel-sided and not constricted waist-like; bullae on T2 brown, transversely elongate, surface entirely smooth, T2 surface anterior to bullae smooth.

Male terminalia: T1–7 well-developed, entirely sclerotised, T8 postero-medially weakly sclerotised, with anterior transverse sclerotised bridge connecting lateral sclerites; T7–8 anteriorly with 2 lateral apodemes; S6 regular, without any special setation postero-medially, S8 well-developed and simple, fused to T8 dorso-laterally, entire (undivided) ventro-medially; epandrium formed by single sclerite (fused medially ± entirely), pointed postero-laterally; subepandrial sclerite without lateral or median protuberances; hypandrium ± flat, rectangular to square sclerite, entirely fused with gonocoxite, forming a gonocoxite-hypandrial complex; gonocoxite dorso-ventrally flattened in distal ½, higher in proximal ½, with palp-like lateral appendage, gonocoxal apodeme present, short (at most slightly extending hypopygium anteriorly); 1 functional aedeagal prong, aedeagal epimere absent; lateral ejaculatory process absent; ejaculatory apodeme formed by single dorso-ventrally oriented plate; ventro-median margin of dorsal aedeagal sheath heavily sclerotised (appearing entirely closed); dorsal aedeagal sheath long, sperm sac entirely covered; sperm sac appearing ± heavily sclerotised.

Re-description female: Head: proboscis brown; maxillary palpus brown.

Antenna: postpedicel ≥ 5.0 times as long as combined length of scape and pedicel.

Thorax: light brown, predominantly grey pubescent; scutum yellow, broad brown median presutural stripe and brown paramedial postsutural stripes; scutum lightly grey pubescent.

Leg: yellow; pro, mes, and met coxa grey pubescent, white setose; femur yellow.

Wing: length = 14.1–14.5 mm; hyaline throughout, slightly brown stained along veins.

Abdomen: T1–7 brown, yellow posterior margin; T1–3 sparsely white setose; S1–7 brown; bullae on T2 black, transversely elongate.

Female genitalia: densely arranged anteriorly directed setae absent, only few on T7–8 and S7–8; T8 with broad anterior rectangular apodeme; T9 formed by wide, rectangular sclerite with median protuberance; T9+10 entirely fused, T10 divided into 2 heavily sclerotised acanthophorite plates, 11 acanthophorite spurs per plate; 3 spermathecae, all equally large, formed by ± expanded weakly sclerotised ducts; individual spermathecal duct long; S9 (furca) formed by 2 sclerites, separated anteriorly and posteriorly, anterior furcal apodeme present, 2 lateral projections forming divided apodeme, lateral furcal apodeme absent, median furcal bridge absent.

Material examined: South Africa: KwaZulu-Natal: 1♂ St. Lucia Lake, 27°56'43"S 32°26'11"E, 4.xi.1920, H. Bell Marley (AAM-003454, NMSA); 1♀ 1♂ Mtunzini, 28°57'00"S 31°45'00"E, 1.xii.1980, R. Oberprieler (AAM-003490–AAM-003491, SANC); 2♂ Tongaat, 29°34'12"S 31°07'06"E, -.ix.1908, H. Burnup (AAM-003452–AAM-003453, NMSA); 1♂ Tongaat, -.-.1908–1909, H. Burnup (AAM-003476, BMNH); 1♀ 1♂ Tongaat River, 29°34'13"S 31°10'47"E, -.-.1908–1909, H. Burnup (AAM-003474–AAM-003475, BMNH); 2♀ Stellabush (= Pigeon Valley Nature Reserve), 29°51'00"S 30°59'00"E, -.-.1915, H. Bell

Marley (AAM-003457–AAM-003458, NMSA); 1♀ 1♂ Stellabush (= Pigeon Valley Nature Reserve), -.i.1915, H. Bell Marley (holotype and paratype, SAMC); 1♀ Stellabush (= Pigeon Valley Nature Reserve), -.-.1915, H. Bell Marley (AAM-003511, SAMC); 5♂ Durban, 29°51'00"S 31°01'00"E, -.i–iii.1959, C. Booth (AAM-003513–AAM-003517, SAMC); 1♀ 1♂ Durban, 13.ii.1963, G. Heinrich (AAM-003483–AAM-003484, CNC); 1? Natal (= Durban), -.iv.1868, W. Saunders (AAM-003477, BMNH); 1♂ Natal (= Durban), -.-.1904, J. Gregoe (AAM-003480, BMNH); 1♂ Natal (= Durban), -.vii.1942, (AAM-003488, SAMC); 1♀ Port-Natal (= Durban), -.-.-, Plant (AAM-003479, BMNH); 1♂ Bluff, Durban, 29°53'00"S 31°03'00"E, 18.i.1904, C. Barker (AAM-003456, NMSA); 1♂ Amanzimtoti, 30°03'00"S 30°53'00"E, -.i.1950, (AAM-003455, NMSA); 1♀ Widenham, 30°12'57"S 30°47'47"E, 2.i.1915, E. Chubb (AAM-003481, BMNH); 1♂ Widenham, 20.xii.1914, (AAM-003512, SAMC); **No locality information**: 1♂, Plant (AAM-003478, BMNH); 1♀ (AAM-003482, BMNH).

Type locality, distribution, and biodiversity hotspot: Stellabush (now Pigeon Valley Nature Reserve, 29°51'51"S 30°59'13"E), Durban, KwaZulu-Natal, South Africa. Maputaland-Pondoland-Albany biodiversity hotspot.

Remarks: Three specimens, two from Tongaat River (AAM-003474–AAM-003475) and one from Tongaat (AAM-003476), all collected in 1908–1909 exhibit a long stump vein (R_3) entirely connecting veins R_2 and R_4 (*e.g.*, Fig. 38). The presence of this connecting stump vein is otherwise only known from and diagnostic for the genus *Parectyphus* (see below). *Ectyphus armipes*, however, does not show any of the other diagnostic features of *Parectyphus* and the male terminalia exhibit the usual *Ectyphus* configuration so that we view the presence of this stump vein as a morphological anomaly.

Ectyphus capillatus Hesse, 1969

Figs 7–8, 17–19, 45

Ectyphus capillatus Hesse 1969: 376; Bowden 1980: 326.

Diagnosis: The species is distinguished from congeners by the yellow facial gibbosity, the distinctly yellow metepimeron, and the dense and long white setae on abdominal tergites 5–7.

Re-description male: Head: black, facial gibbosity yellow, in general lightly silver pubescent; width distinctly greater than thorax, interocular distance on vertex larger than at ventral eye margin, vertex between compound eyes slightly depressed, parafacial area very narrow, facial gibbosity nearly touching median eye margin; facial gibbosity distinct, well-developed and discernible in lateral view; mystax white, covering only lateral facial gibbosity (asetose medially); frons medially apubescent, laterally grey pubescent, vertex predominantly apubescent, only lateral margin grey pubescent, postgena lightly silver pubescent; setation: vertex white, frons white, ocp setae white, pocl

setae white; ocellar triangle apubescent; proboscis brown, short, about ½ length of oral cavity; labellum small, as wide as prementum, as long as prementum, unsclerotised laterally; maxillary palpus cylindrical, brown, longer than ½ length of proboscis.

Antenna: brown, scape and pedicel white and yellow setose dorsally and ventrally; postpedicel cylindrical in proximal ½, symmetrically bulbous in distal ½, ≥ 7.0 times as long as combined length of scape and pedicel; apical ‚seta-like' sensory element situated apically in cavity on postpedicel.

Thorax: brown, lightly grey pubescent; scutum yellow, broad brown median presutural stripe and brown paramedial postsutural stripes, surface entirely smooth, predominantly yellow pubescent, paramedial and sublateral stripes apubescent, scutal setation comprised of distinct rows of long dorsocentral setae and lateral scutal setae; dc setae pre- and postsuturally light brown, acr setae absent, lateral scutal setae white, npl, spal, and pal setae absent; postpronotal lobe yellow, partly white pubescent; proepisternum, lateral postpronotum, and postpronotal lobe long white setose; scutellum apubescent, asetose, apical scutellar setae absent; mesopostnotum, anatergite, and katatergite grey pubescent, asetose; katatergite elevated and smoothly convex; anterior anepisternum asetose, supero-posterior anepisternum asetose; posterior anepimeron long white setose, katepimeron asetose; metepimeron evenly elevated, yellow, lightly silver pubescent, asetose; metepisternum silver pubescent, asetose.

Leg: light brown, setation predominantly white; pro, mes, and met coxa apubescent, long white setose; met trochanter macrosetose medially; femur light brown, met femur evenly clubbed in distal ¾, in distal ½ macrosetose, 1 antero-ventral and 1 postero-ventral row of macrosetae; pro, mes, and met tibia straight, met tibia cylindrical with distinct ventral keel terminating into a sharp spine; pro and mes tarsomere 1 longer than tarsomere 2, but less than combined length of tarsomeres 2–3, met tarsomere 1 as long as combined length of tarsomeres 2–3; pulvillus well-developed, as long as well-developed claw, and as wide as base of claw; empodium absent.

Wing: length = 10.7–13.1 mm; hyaline throughout, slightly brown stained along veins, veins light brown, microtrichia absent; cells r_1, r_4, r_5, m_3, + cu*p* closed; C well-developed, around entire wing; R_4 terminates in R_1; R_5 terminates in R_1; stump vein (R_3) at base of R_4 present, long but not reaching R_2; R_4 and R_5 widest apart medially; r-m distinct, R_{4+5} and M_1 apart, connected by crossvein; M_1 straight at r-m (not curving anteriorly), M_1 (or M_1+M_2) terminates in C; CuA_1 and CuA_2 split proximally to m-cu (cell m_3 narrow proximally); M_3+CuA_1 terminate together in C; A_1 undulating, cell a_1 wide, A_1 and wing margin further apart proximally than distally; alula well-developed; halter light yellow.

Abdomen: brown; setation comprised of dense long white setose, surface microrugose; T1 brown, T2–7 brown with yellow posterior margin broadly interrupted medially; T1–3 densely long white setose; T entirely grey pubescent; S1 light brown, S2–5 yellow, brown anteriorly, S6–7 brown with yellow posterior margin; S1 asetose, S2–3 sparsely white setose; S predominantly apubescent; T2–4 parallel-sided and not constricted waist-like; bullae on T2 black, transversely elongate, surface entirely smooth, T2 surface anterior to bullae smooth.

Male terminalia: T1–7 well-developed, entirely sclerotised, T8 postero-medially weakly sclerotised, with anterior transverse sclerotised bridge connecting lateral sclerites; T7–8 anteriorly with 2 lateral apodemes; S6 regular, without any special setation postero-medially, S8 well-developed and simple, fused to T8 dorso-laterally, entire (undivided) ventro-medially; epandrium formed by single sclerite (fused medially ± entirely), rounded postero-laterally; subepandrial sclerite without lateral or median protuberances; hypandrium ± flat, rectangular to square sclerite, entirely fused with gonocoxite, forming a gonocoxite-hypandrial complex; gonocoxite dorso-ventrally flattened in distal ½, higher in proximal ½, with palp-like lateral appendage, gonocoxal apodeme present, short (at most slightly extending hypopygium anteriorly); 1 functional aedeagal prong, aedeagal epimere absent; lateral ejaculatory process absent; ejaculatory apodeme formed by single dorso-ventrally oriented plate; ventro-median margin of dorsal aedeagal sheath heavily sclerotised (appearing entirely closed); dorsal aedeagal sheath long, sperm sac entirely covered; sperm sac appearing ± heavily sclerotised.

Description female: female unknown.

Material examined: South Africa: Eastern Cape Province: 1♂ Double Drift, Andries Vosloo Kudu Reserve, 33°06'00"S 26°47'00"E, 14.xii.1988, A. Weaving (AAM-003502, AMGS); 1♂ Resolution, 33°10'00"S 26°37'00"E, 4.i.1928, A. Walton (paratype, NMSA); 1♂ Brakkloof, 33°12'00"S 26°50'00"E, -.-.1907, G. White (holotype, SAMC).

Type locality, distribution, and biodiversity hotspot: Brakkloof (33°12'00"S 026°50'00"E), Eastern Cape, South Africa. Maputaland-Pondoland-Albany biodiversity hotspot.

Remarks: The ♂ paratype specimen was collected at Resolution, which is also the type locality of *Ectyphus bitaeniatus* Hesse, 1969 (synonymised with *Ectyphus pinguis* below). *Ectyphus bitaeniatus* is known from the ♀ holotype only. Although both specimens from Resolution were collected by the same collector (A. Walton), the specimens originate from separate collecting events although during the same summer of 1927–1928 and were collected only some 12 days apart. Hesse (1969: 377) mistakenly lists the *E. capillatus* paratype to be collected in January 1924 while the label indicates January 1928 (B. Muller pers. comm.). As *E. capillatus* is still only known in the ♂ sex and no other species of *Ectyphus* has ever been collected at Resolution, it is possible that *E. bitaeniatus* represents the ♀ of *E. capillatus*. Until more specimens from this area north-east of Grahamstown, in which all three collecting localities of *E. capillatus* are situated, become available we cannot definitely provide confirmation of the possible synonymy. *E. capillatus* would take priority by page number.

Ectyphus pinguis Gerstaecker, 1868

Figs 20–22, 29, 31–37, 45

Ectyphus pinguis Gerstaecker 1868: 92; Bezzi 1924: 196; Hesse 1969: 369; Bowden 1980: 326.

Ectyphus pinguis var. litoralis Hesse 1969: 372. unavailable name
Ectyphus pinguis var. karooensis Hesse 1969: 374. unavailable name
Ectyphus pinguis var. ceramiiformis Hesse 1969: 375. unavailable name
Ectyphus bitaeniatus Hesse 1969: 380. syn. n.
Ectyphus flavidorsalis Hesse 1969: 378. syn. n.

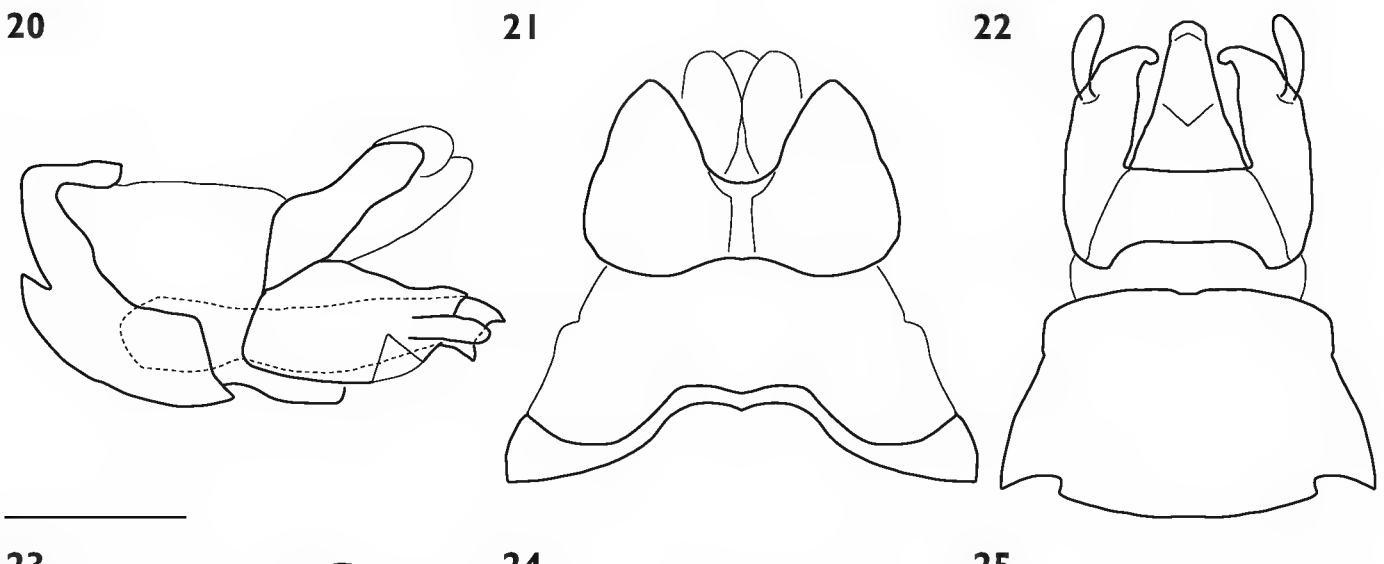
Diagnosis: The species is distinguished from congeners by the enlarged yellow facial gibbosity, the yellow posterior margin of the abdominal tergites that are widened laterally and interrupted medially, and the distinctly yellow metepimeron.

Re-description male: Head: black, facial gibbosity yellow, in general lightly silver pubescent; width distinctly greater than thorax, interocular distance on vertex larger than at ventral eye margin, vertex between compound eyes slightly depressed, parafacial area very narrow, facial gibbosity nearly touching median eye margin; facial gibbosity distinct, well-developed and discernible in lateral view; mystax white, covering only lateral facial gibbosity (asetose medially); frons medially apubescent, laterally grey pubescent, vertex apubescent, postgena lightly silver pubescent; setation: vertex white, frons white, ocp setae white, pocl setae white; ocellar triangle apubescent; proboscis light brown, short, about ½ length of oral cavity; labellum small, as wide as prementum, as long as prementum, unsclerotised laterally; maxillary palpus cylindrical, brown, longer than ½ length of proboscis.

Antenna: brown, scape and pedicel white and yellow setose dorsally and ventrally; postpedicel cylindrical in proximal ½, symmetrically bulbous in distal ½, ≥ 8.0 times as long as combined length of scape and pedicel; apical ‚seta-like' sensory element situated apically in cavity on postpedicel.

Thorax: dark brown to bluish-black, predominantly grey pubescent; scutum medially brown, laterally dark yellow, surface entirely smooth, lightly grey pubescent, scutal setation comprised of distinct rows of short dorsocentral setae and lateral scutal setae; dc setae pre- and postsuturally white, acr setae absent, lateral scutal setae white, npl, spal, and pal setae absent; postpronotal lobe yellow, partly white pubescent; proepisternum, lateral postpronotum, and postpronotal lobe long white setose; scutellum apubescent, asetose medially, laterally yellow setose, apical scutellar setae absent; mesopostnotum, anatergite, and katatergite silver pubescent, asetose; katatergite elevated and smoothly convex; anterior anepisternum asetose, supero-posterior anepisternum asetose; posterior anepimeron long white setose, katepimeron asetose; metepimeron evenly elevated, yellow, lightly silver pubescent, asetose; metepisternum silver pubescent, asetose.

Leg: light brown, setation predominantly white; pro, mes, and met coxa apubescent, long white setose; met trochanter macrosetose medially; femur brown, met femur evenly clubbed in distal ¾, in distal ½ macrosetose, 1 antero-ventral and 1 postero-ventral row of macrosetae; pro, mes, and met tibia straight, met tibia cylindrical with distinct ventral keel terminating into a sharp spine; pro and mes tarsomere 1 longer than tarsomere 2, but less than combined length of tarsomeres 2–3, met tarsomere 1 as long as combined length of tarsomeres 2–3; pulvillus well-developed, as long as well-developed claw, and as wide as base of claw; empodium absent.



Figures 20–30. Male terminalia and female genitalia of *Ectyphus* and *Parectyphus* species. Male terminalia: **20–22** *E. pinguis* **20** lateral **21** dorsal **22** ventral; **23–25** *E. pretoriensis* **23** lateral **24** dorsal **25** ventral; **26–28** *P. namibiensis* **26** lateral **27** dorsal **28** ventral; Female genitalia in dorsal view: **29** *E. pinguis* **30** *P. namibiensis*. Scale lines = 1 mm.

Wing: length = 10.2–13.3(–14.2) mm; hyaline throughout, slightly brown stained along veins, veins light brown, microtrichia absent; cells r_1, r_4, r_5, m_3, + cu*p* closed; C well-developed, around entire wing; R_4 terminates in R_1; R_5 terminates in R_1; stump vein (R_3) at base of R_4 present, long but not reaching R_2; R_4 and R_5 widest apart medi-

ally; r-m distinct, R_{4+5} and M_1 apart, connected by crossvein; M_1 straight at r-m (not curving anteriorly), M_1 (or M_1+M_2) terminates in C; CuA_1 and CuA_2 split proximally to m-cu (cell m_3 narrow proximally); M_3+CuA_1 terminate together in C; A_1 undulating, cell a_1 wide, A_1 and wing margin further apart proximally than distally; alula well-developed; halter light yellow.

Abdomen: brown; setation comprised of scattered white setae, surface entirely smooth; T1 brown, narrow yellow posterior margin, T2–7 brown, broad yellow posterior margin, expanding antero-laterally particularly on T2–3; T1 long white setose, T2–3 sparsely white setose; T predominantly apubescent; S1 yellow, S2–7 yellow with brown areas medially and laterally; S1–3 asetose; S predominantly apubescent; T2–4 parallel-sided and not constricted waist-like; bullae on T2 black, transversely elongate, surface entirely smooth, T2 surface anterior to bullae smooth.

Male terminalia: T1–7 well-developed, entirely sclerotised, T8 postero-medially weakly sclerotised, with anterior transverse sclerotised bridge connecting lateral sclerites; T7–8 anteriorly with 2 lateral apodemes; S6 regular, without any special setation postero-medially, S8 well-developed and simple, fused to T8 dorso-laterally, entire (undivided) ventro-medially; epandrium formed by single sclerite (fused medially ± entirely), pointed postero-laterally; subepandrial sclerite without lateral or median protuberances; hypandrium ± flat, rectangular to square sclerite, entirely fused with gonocoxite, forming a gonocoxite-hypandrial complex; gonocoxite dorso-ventrally flattened in distal ½, higher in proximal ½, with palp-like lateral appendage, gonocoxal apodeme present, short (at most slightly extending hypopygium anteriorly); 1 functional aedeagal prong, aedeagal epimere absent; lateral ejaculatory process absent; ejaculatory apodeme formed by single dorso-ventrally oriented plate; ventro-median margin of dorsal aedeagal sheath heavily sclerotised (appearing entirely closed); dorsal aedeagal sheath long, sperm sac entirely covered; sperm sac appearing ± heavily sclerotised.

Re-description female: Head: brown, facial gibbosity yellow; mystax white, sparse short setae covering entire facial gibbosity; vertex predominantly apubescent, only lateral margin grey pubescent; maxillary palpus light brown.

Thorax: brown; scutum surface entirely smooth, scutal setation comprised of distinct rows of long dorsocentral setae and lateral scutal setae.

Leg: femur light brown.

Wing: length = 12.0–13.7 mm.

Female genitalia: densely arranged anteriorly directed setae absent, only few on T7–8 and S7–8; T8 with broad anterior rectangular apodeme; T9 formed by wide, rectangular sclerite with median protuberance; T9+10 entirely fused, T10 divided into 2 heavily sclerotised acanthophorite plates, 11 acanthophorite spurs per plate; 3 spermathecae, all equally large, formed by ± expanded weakly sclerotised ducts; individual spermathecal duct long; S9 (furca) formed by 2 sclerites, separated anteriorly and posteriorly, anterior furcal apodeme present, 2 lateral projections forming divided apodeme, lateral furcal apodeme absent, median furcal bridge absent.

Material examined: South Africa: 1♂ ‚Africa australis', Drège (lectotype, ZMHB); 1F, Capland', Drège (paralectotype, ZMHB); Eastern Cape Province: 1♂ Cuylerville,

Figures 31–34. Photographs of *Ectyphus pinguis* specimens. **31** *E. pinguis* (♂, AAM-003496, AMGS, Morphbank) **32** *E. pinguis* (♂, AAM-003487, SAMC, Morphbank) **33** *E. pinguis* (♀, AAM-003509, SAMC, Morphbank) **34** *E. pinguis* (♂ holotype *E. pinguis* var. ceramiiformis, NMSA, Morphbank). Scale lines = 5 mm.

31°47'00"S 26°56'00"E, 20.xii.1920, H. Cronwright (AAM-003522, SAMC); 1♀ Resolution, 33°10'00"S 26°37'00"E, 23.xii.1927, A. Walton (holotype *Ectyphus bitaeniatus*, NMSA); 1♂ Willowmore, 33°17'00"S 23°29'00"E, -.-.-, J. Brauns (holotype *Ectyphus pinguis* var. ceramiiformis, NMSA); 2♂ Willowmore, -.-.-, J. Brauns (holotype and paratype *Ectyphus pinguis* var. karooensis, NMSA); 1♀ Willowmore, -.-.-, J. Brauns (AAM-003492, USNM); 1♀ Willowmore, 20.xii.1909, J. Brauns (paratype *Ectyphus flavidorsalis*, NMSA); 1♀ Albany District, 33°24'00"S 26°32'00"E, -.xii.1949, R. Phillips (AAM-003473, BMNH); 1♀ Georgida, 33°27'00"S 23°17'00"E, 5.i.1927, J. Brauns (holotype *Ectyphus flavidorsalis*, NMSA); 1♀ 1♂ Dunbrody, 33°28'00"S 25°33'00"E, -.-.1897, O'Neil (AAM-003509–AAM-003510, SAMC); 1♂ Kleinemonde, 33°31'39"S 27°03'00"E, -.-.-, J. Cooper (AAM-003487, SAMC); 2♂ Kleinemonde, -.i.1891, M. White (AAM-003520–AAM-003521, SAMC); 1♀ Port Alfred, 33°36'00"S 26°54'00"E, 17.ii.1955, F. Junor (paratype *Ectyphus pinguis* var. litoralis, SAMC); 1♂ Port Alfred, 9.i.1971, J. Londt (AAM-003503, AMGS); 1♀ Port Alfred (AAM-003508, SAMC); 1♀ 2♂ Riet River mouth, 33°36'00"S 26°54'00"E, 17.xii.1971, D. Greathead (AAM-003470–AAM-003472, BMNH); 1♀ 3♂ Rietrivier mouth, near Port Alfred, 17.xii.1974, F. Gess (AAM-003493–AAM-003496, AMGS); 5♂ Rietrivier mouth, near Port Alfred, 29.xii.1973, F. Gess (AAM-003497–AAM-003501, AMGS); 2♂ Algoa Bay, 33°41'34"S 25°56'39"E, 15.xii.1892, J. Brauns

Figures 35–38. Photographs of *Ectyphus pinguis* specimens and wings of *E. pinguis* and *P. namibiensis*. **35** *E. pinguis* (♀ holotype *E. bitaeniatus*, NMSA, Morphbank) **36** *E. pinguis* (♀ holotype *E. flavidorsalis*, NMSA, Morphbank); Wings **37** *E. pinguis* (AAM-003463, NMSA, Morphbank) **38** *P. namibiensis* (AAM-003506, NMNW, Morphbank). Scale lines = 5 mm.

(ZSMC); 2♀ 2♂ Swartkops, Algoa Bay, 33°51'49"S 25°36'06"E, 25.xi.1921, J. Brauns (AAM-003447, AAM-003459–AAM-003461, NMSA); 1♂ Swartkops, Algoa Bay, 25.xi.1921, J. Brauns (AAM-003466, MZLU); 1♂ Swartkops, Algoa Bay, -.i.1919, B. Krüger (DEIC); 3♀ Swartkops, Port Elizabeth, 20.xi.1919, B. Krüger (AAM-003448, AAM-003462–AAM-03463, NMSA); 1♀ Swartkops, Port Elizabeth, -.ii.1919, B. Krüger (AAM-003465, NMSA); 1♂ Swartkops, Port Elizabeth, 25.xi.1919, B. Krüger (AAM-003464, NMSA); 1♀ 1♂ Swartkops, Port Elizabeth, 25.xi.1919, B. Krüger (AAM-003467–AAM-003468, ISNB); 4♀ 6♂ Gamtoos River Mouth, Papiesfontein, 33°57'47"S 25°01'46"E, -.i.1960, SAM Museum Staff (paratype *Ectyphus pinguis* var. litoralis, SAMC); 1♂ Van Staden's River Mouth, 33°58'00"S 25°13'00"E, -.i.1960, SAM Museum Staff (paratype *Ectyphus pinguis* var. litoralis, SAMC); 1♀ 1♂ Port Elizabeth, 33°58'00"S 25°35'00"E, 1.ii.1950, A. Brown (AAM-003450–AAM-003451, NMSA); 1♀ Port Elizabeth, 1.i.1971, M. Strydom (AAM-003034, SANC); 2♀ 3♂ Port Elizabeth, Cape Recife area, 34°01'14"S 25°40'60"E, 22–27.xii.1985, J. Londt (AAM-003442–AAM-003446, NMSA); 1♂ Jeffrey's Bay, Humansdorp, 34°02'00"S 24°46'00"E, 23.xii.1922, J. Brauns (AAM-003469, BMNH); 1♀ The Willows, Port Elizabeth, 34°02'00"S 25°36'00"E, 28.xii.1970, M. Strydom (AAM-003489, SANC); 1♂ Jeffrey's Bay, 34°03'00"S 24°55'00"E, 19.xii.1922, (DEIC); 9♀ 3♂ Jeffrey's Bay, -.i.1960, SAM Museum Staff (holotype and paratype *Ectyphus pinguis* var. litoralis, SAMC); 1♀ 1♂ Jeffrey's Bay, -.i.1960, SAM Museum Staff (paratype *Ectyphus pinguis* var. litoralis, ISNB); 1♀ 1♂ Jeffrey's Bay, -.-.-, (AAM-003828–AAM-003829, SMNS); Western Cape Province: 1♀ Tulbagh, 33°17'00"S 19°09'00"E, 10.xii.1924, J. Brauns (AAM-003449, NMSA); 1♂ ‚Cape of Good Hope', 33°48'03"S 19°00'36"E, -.-.1835, J. Verreaux (MNHN).

Type locality, distribution, and biodiversity hotspots: The original type locality is ‚Africa australis' (South Africa). Following recommendation 76A.1.4. of the *International Code of Zoological Nomenclature* (4th edition) a new type locality is selected from within the range of the species. We hereby designate the Riet River mouth (33°36'00"S 026°54'00"E), near Port Alfred, Eastern Cape, South Africa as the new type locality. Cape Floristic Region and Maputaland-Pondoland-Albany biodiversity hotspots.

Remarks: Specimens identified as belonging to the three varieties of *E. pinguis* were examined, including a large series of paratypes of *E. pinguis* var. litoralis. These specimens were determined to represent colour and vestiture variation in *E. pinguis*, rather than belonging to distinct subspecies. The three names, *Ectyphus pinguis* var. litoralis, *Ectyphus pinguis* var. karooensis, and *Ectyphus pinguis* var. ceramiiformis, were proposed by Hesse to delimit infrasubspecific entities. Because these names were never adopted as valid for a species or subspecies, as was already pointed out by Bowden (1980: 326), the names are unavailable following the *International Code of Zoological Nomenclature* (4th edition, Article 45.6.4. and 45.6.4.1.). The unique female holotype of *E. bitaeniatus* and the two female type specimens of *E. flavidorsalis* were also examined. These specimens represent *E. pinguis* in our view and are here synonymised with this species. Similar colour variation as exhibited by these two species was observed in female specimens of *E. pinguis* and therefore does not characterise distinct species. Hesse (1969: 372) mentioned the ♀ specimen from Tulbagh in the Western Cape as probably being mislabelled. We have studied the specimen and agree with his identification as *E. pinguis*, but cannot add any information whether the locality is correct or not. This locality is far removed from any other locality in the eastern Western Cape and in the western Eastern Cape provinces (Fig. 45).

Ectyphus pretoriensis (Bezzi, 1924)

Figs 9–10, 23–25, 45

Ectyphus pretoriensis (Bezzi, 1924) Hesse 1969: 377; Bowden 1980: 326.
Ectyphus armipes subsp. *pretoriensis* Bezzi 1924: 197.

Diagnosis: The species is distinguished from congeners by the brown metepimeron, the white setation on the head and scutum, the narrow posterior yellow margin on abdominal tergites, and its apparent distribution in Pretoria.

Re-description male: Head: black, facial gibbosity light brown, in general lightly silver pubescent; width distinctly greater than thorax, interocular distance on vertex larger than at ventral eye margin, vertex between compound eyes slightly depressed, parafacial area very narrow, facial gibbosity nearly touching median eye margin; facial gibbosity distinct, well-developed and discernible in lateral view; mystax white, covering entire facial gibbosity; frons entirely grey pubescent, vertex medially apubescent, laterally silver pubescent, postgena lightly silver pubescent; setation: vertex white, frons white, ocp setae white, pocl setae white; ocellar triangle apubescent; proboscis brown,

short, about ½ length of oral cavity; labellum small, as wide as prementum, about ¾ length of prementum, unsclerotised laterally; maxillary palpus cylindrical, light brown, longer than ½ length of proboscis.

Antenna: brown, scape and pedicel white setose dorsally and ventrally; postpedicel cylindrical in proximal ½, symmetrically bulbous in distal ½, ≥ 5.0 times as long as combined length of scape and pedicel; apical ‚seta-like' sensory element situated apically in cavity on postpedicel.

Thorax: brown, lightly grey pubescent; scutum medially dark brown, laterally brown, surface entirely smooth, lightly grey pubescent, scutal setation comprised of distinct rows of long dorsocentral setae and lateral scutal setae; dc setae pre- and postsuturally white, acr setae absent, lateral scutal setae white, npl, spal, and pal setae absent; postpronotal lobe light brown, grey pubescent; proepisternum, lateral postpronotum, and postpronotal lobe long white setose; scutellum lightly grey pubescent, long white setose, apical scutellar setae present; mesopostnotum, anatergite, and katatergite silver pubescent, asetose; katatergite elevated and smoothly convex; anterior anepisternum asetose, supero-posterior anepisternum asetose; posterior anepimeron long white setose, katepimeron asetose; metepimeron evenly elevated, same colour as T1, lightly silver pubescent, asetose; metepisternum silver pubescent, asetose.

Leg: light brown, setation predominantly white; pro, mes, and met coxa grey pubescent, white setose; met trochanter macrosetose medially; femur light brown, met femur evenly clubbed in distal ¾, in distal ½ macrosetose, 1 antero-ventral and 1 postero-ventral row of macrosetae; pro, mes, and met tibia straight, met tibia cylindrical with distinct ventral keel terminating into a sharp spine; pro and mes tarsomere 1 as long as combined length of tarsomeres 2–3, met tarsomere 1 as long as combined length of tarsomeres 2–3; pulvillus well-developed, as long as well-developed claw, and as wide as base of claw; empodium absent.

Wing: length = 11.6 mm; hyaline throughout, veins light brown, microtrichia absent; cells r_1, r_4, r_5, m_3, + cu*p* closed; C well-developed, around entire wing; R_4 terminates in R_1; R_5 terminates in R_1; stump vein (R_3) at base of R_4 present, short not reaching R_2; R_4 and R_5 widest apart medially; r-m distinct, R_{4+5} and M_1 apart, connected by crossvein; M_1 straight at r-m (not curving anteriorly), M_1 (or M_1+M_2) terminates in C; CuA_1 and CuA_2 split proximally to m-cu (cell m_3 narrow proximally); M_3+CuA_1 terminate together in C; A_1 undulating, cell a_1 wide, A_1 and wing margin further apart proximally than distally; alula well-developed; halter light brown.

Abdomen: brown; setation comprised of scattered white setae, surface entirely smooth; T1–7 brown with narrow light brown to dark yellow posterior margin; T1 long white setose, T2–3 sparsely white setose; T1–4 anteriorly lightly grey pubescent, T5–7 apubescent; S1 yellow, S2–7 brown with light brown posterior margin; S1 asetose, S2–3 sparsely white setose; S predominantly apubescent; T2–4 parallel-sided and not constricted waist-like; bullae on T2 brown, transversely elongate, surface entirely smooth, T2 surface anterior to bullae smooth.

Male terminalia: T1–7 well-developed, entirely sclerotised, T8 postero-medially weakly sclerotised, with anterior transverse sclerotised bridge connecting lateral scle-

rites; T7–8 anteriorly with 2 lateral apodemes; S6 regular, without any special setation postero-medially, S8 well-developed and simple, fused to T8 dorso-laterally, entire (undivided) ventro-medially; epandrium formed by single sclerite (fused medially ± entirely), pointed postero-laterally; subepandrial sclerite without lateral or median protuberances; hypandrium ± flat, rectangular to square sclerite, entirely fused with gonocoxite, forming a gonocoxite-hypandrial complex; gonocoxite dorso-ventrally flattened in distal ½, higher in proximal ½, with palp-like lateral appendage, gonocoxal apodeme present, short (at most slightly extending hypopygium anteriorly); 1 functional aedeagal prong, aedeagal epimere absent; lateral ejaculatory process absent; ejaculatory apodeme formed by single dorso-ventrally oriented plate; ventro-median margin of dorsal aedeagal sheath heavily sclerotised (appearing entirely closed); dorsal aedeagal sheath long, sperm sac entirely covered; sperm sac appearing ± heavily sclerotised.

Re-description female: Head: brown, facial gibbosity yellow; vertex entirely grey pubescent; maxillary palpus brown.

Antenna: scape and pedicel white and yellow setose dorsally and ventrally.

Thorax: light brown; scutum yellow, broad brown median presutural stripe and brown paramedial postsutural stripes, surface entirely smooth; scutal setation comprised of distinct rows of short dorsocentral setae and lateral scutal setae; postpronotal lobe yellow, partly white pubescent; proepisternum, lateral postpronotum, and postpronotal lobe short white setose; metepimeron silver pubescent, asetose.

Leg: brown and yellow; femur brown.

Wing: length = 11.9 mm; halter light yellow.

Abdomen: brown and yellow; T1 brown, T2 brown with yellow anterior and posterior margin, T3–7 brown laterally and yellow medially; T1–3 sparsely white setose; S1 yellow, S2–7 brown with scattered yellow areas; bullae on T2 black, transversely elongate.

Female genitalia: densely arranged anteriorly directed setae absent, only few on T7–8 and S7–8; T8 with broad anterior rectangular apodeme; T9 formed by wide, rectangular sclerite with median protuberance; T9+10 entirely fused, T10 divided into 2 heavily sclerotised acanthophorite plates, 11 acanthophorite spurs per plate; 3 spermathecae, all equally large, formed by ± expanded weakly sclerotised ducts; individual spermathecal duct long; S9 (furca) formed by 2 sclerites, separated anteriorly and posteriorly, anterior furcal apodeme present, 2 lateral projections forming divided apodeme, lateral furcal apodeme absent, median furcal bridge absent.

Material examined: South Africa: Gauteng Province: 1♂ Willows, Pretoria, 25°44'60"S 28°20'47"E, 23.ix.1917, H. Munro (lectotype, SAMC); 1♀ 1♂ Willows, Pretoria, 23.ix.1917, H. Munro (NMSA); 1♀ Fairy Glen (= Faerie Glen), Pretoria, 25°46'24"S 28°18'03"E, 19.ix.1915, H. Munro (paralectotype, SAMC); 1♂ Fairy Glen (= Faerie Glen), Pretoria, 19.ix.1915, H. Munro (NMSA).

Type locality, distribution, and biodiversity hotspot: Willows (suburb of Pretoria), 25°44'60"S 28°20'47"E, Gauteng, South Africa. Does not occur in any currently recognised biodiversity hotspot.

Remarks: In order to preserve taxonomic stability and make more universal the use of this specific name, the ♂ specimen from Willows, is here designated as the lectotype, making the ♀ specimen from Faerie Glen a paralectotype.

Genus *Parectyphus* Hesse, 1972

Parectyphus Hesse 1972: 165. Type species: *Parectyphus namibiensis* Hesse, 1972, by monotypy.

Diagnosis: The genus can be distinguished from other Afrotropical Mydidae by the presence of a complete stump vein (R_3) connecting R_2 and R_4, the distinctly clubbed metathoracic femur, the presence of a ventral keel on the metathoracic tibia terminating into a well-developed apical spine, M_3+CuA_1 terminate together into C on the posterior wing margin, the configuration of the male terminalia, and its apparent distribution in south-western Namibia and far north-western South Africa.

Parectyphus namibiensis Hesse, 1972

Figs 26–28, 30, 38–44, 45

Parectyphus namibiensis Hesse 1972: 165; Bowden 1980: 326.

Diagnosis: See above for generic diagnosis.

Re-description male: Head: black, facial gibbosity light brown, rarely black, in general rarely predominantly apubescent, yellow pubescent on median eye margin; width distinctly greater than thorax, interocular distance on vertex larger than at ventral eye margin, vertex between compound eyes slightly depressed, parafacial area very narrow, facial gibbosity nearly touching median eye margin; facial gibbosity distinct, well-developed and discernible in lateral view; mystax white, covering entire facial gibbosity, rarely yellow, covering entire facial gibbosity; frons predominantly apubescent, vertex medially apubescent, laterally grey pubescent, rarely medially apubescent, laterally yellow pubescent, postgena lightly silver pubescent; setation: vertex white, rarely yellow, frons white, rarely yellow, ocp setae white, rarely yellow, pocl setae white, rarely yellow; ocellar triangle apubescent; proboscis brown, long, projecting beyond frontoclypeal suture; labellum small, as wide as prementum, as long as prementum, unsclerotised laterally; maxillary palpus cylindrical, brown, about ½ length of proboscis.

Antenna: brown, scape and pedicel brown setose dorsally and ventrally; postpedicel cylindrical in proximal ½, symmetrically bulbous in distal ½, ≥ 4.0 times as long as combined length of scape and pedicel, rarely ≥ 6.0 times as long as combined length of scape and pedicel; apical ‚seta-like' sensory element situated apically in cavity on postpedicel.

Thorax: brown, rarely dark brown to bluish-black, scutum predominantly grey pubescent, pleura predominantly apubescent, rarely predominantly yellow pubescent;

Figures 39–44. Photographs of *Parectyphus namibiensis* specimens. **39 + 42** *P. namibiensis* (♂ holotype, SMNS) **39** lateral (Morphbank) **42** head lateral (Morphbank); **40, 41, + 43** *P. namibiensis* (♂, AAM-003485, SAMC) **40** lateral (Morphbank) **41** dorsal (Morphbank) **43** head lateral (Morphbank) **44** *P. namibiensis* (♂, AAM-003606, NMNW, Morphbank). Scale lines = 5 mm.

scutum medially bluish-black, laterally brown, surface entirely smooth, lightly grey pubescent, rarely lightly yellow pubescent, paramedial stripes (merging postsuturally) and posterior lateral stripes densely yellow pubescent, scutal setation comprised of scattered short white, sometimes black, setae with distinct rows of long dorsocentral setae and lateral scutal setae; dc setae pre- and postsuturally white, rarely pre- and postsuturally black, acr setae present, lateral scutal setae white, rarely black, npl, spal, and pal setae absent; postpronotal lobe light brown, partly silver pubescent, rarely dark brown, partly yellow pubescent; proepisternum, lateral postpronotum, and postpronotal lobe long brown setose, rarely long black setose; scutellum lightly grey pubescent, long white setose, rarely lightly grey pubescent, long black setose, apical scutellar setae

present; mesopostnotum, anatergite, and katatergite grey pubescent, rarely lightly yellow pubescent, mesopostnotum asetose, anatergite long black setose or long white setose, katatergite asetose; katatergite elevated and smoothly convex; anterior anepisternum asetose, supero-posterior anepisternum long white setose, rarely long black setose; posterior anepimeron long black setose or long white setose, katepimeron asetose; metepimeron evenly elevated, same colour as T1, apubescent, asetose, rarely silver pubescent, asetose; metepisternum silver pubescent, asetose.

Leg: brown, setation black and white; pro coxa apubescent, long black setose, mes coxa lightly silver pubescent, long white and black setose, rarely apubescent, long black setose, met coxa lightly silver pubescent, long white and black setose, rarely apubescent, long black setose; met trochanter setose medially or macrosetose medially; femur brown, met femur evenly clubbed in distal ¾, in distal ½ macrosetose, 1 antero-ventral and 1 postero-ventral row of macrosetae; pro, mes, and met tibia straight, met tibia cylindrical with distinct ventral keel terminating into a sharp spine; pro and mes tarsomere 1 about as long as individual tarsomeres 2, 3, or 4, met tarsomere 1 slightly longer than tarsomere 2, tarsomeres 1 and 2 longer than tarsomeres 3 and 4 combined; pulvillus well-developed, as long as well-developed claw, and as wide as base of claw; empodium absent.

Wing: length = 13.5–15.5 mm; generally hyaline, sometimes slightly brown stained along veins, veins light brown, microtrichia absent; cells r_1, r_4, r_5, m_3, + cu*p* closed; C well-developed, around entire wing; R_4 terminates in R_1; R_5 terminates in R_1; stump vein (R_3) at base of R_4 present, long and connecting R_4 and R_2; R_4 and R_5 widest apart medially; r-m distinct, R_{4+5} and M_1 apart, connected by crossvein; M_1 straight at r-m (not curving anteriorly), M_1 (or M_1+M_2) terminates in C; CuA_1 and CuA_2 split proximally to m-cu (cell m_3 narrow proximally); M_3+CuA_1 terminate together in C; A_1 undulating, cell a_1 wide, A_1 and wing margin further apart proximally than distally; alula well-developed; halter light brown, rarely brown.

Abdomen: brown to bluish-black; setation comprised of scattered white and black setae, surface microrugose; T1–7 brown, rarely dark brown with narrow light brown posterior margin; T1 long white setose, T2–3 short black setose, rarely T1 long black setose, T2–3 short black setose; T predominantly apubescent; S1 light brown, S2–7 light brown with narrow yellow posterior margin, rarely S1–7 brown; S1 asetose, S2–3 short black setose; S predominantly apubescent; T2–4 parallel-sided and not constricted waist-like; bullae on T2 black, transversely elongate, surface entirely smooth, T2 surface anterior to bullae smooth ;.

Male terminalia: T1–7 well-developed, entirely sclerotised, T8 postero-medially weakly sclerotised, with anterior transverse sclerotised bridge connecting lateral sclerites; T7–8 anteriorly with 2 lateral apodemes; S6 regular, without any special setation postero-medially, S8 well-developed and simple, fused to T8 dorso-laterally, entire (undivided) ventro-medially; epandrium formed by single sclerite (fused medially ± entirely), pointed postero-laterally; subepandrial sclerite without lateral or median protuberances; hypandrium ± flat, rectangular to square sclerite, entirely fused with gonocoxite, forming a gonocoxite-hypandrial complex; gonocoxite dorso-ventrally flattened

in distal ½, higher in proximal ½, with palp-like lateral appendage, gonocoxal apodeme present, short (at most slightly extending hypopygium anteriorly); 1 functional aedeagal prong, aedeagal epimere absent; lateral ejaculatory process absent; ejaculatory apodeme formed by single dorso-ventrally oriented plate; ventro-median margin of dorsal aedeagal sheath heavily sclerotised (appearing entirely closed); dorsal aedeagal sheath long, sperm sac entirely covered; sperm sac appearing ± heavily sclerotised.

Description female: Head: in general yellow pubescent; mystax black, covering entire facial gibbosity; frons yellow pubescent, vertex medially apubescent, laterally yellow pubescent; setation: vertex black, frons black, ocp setae black, pocl setae black.

Antenna: postpedicel ≥ 5.0 times as long as combined length of scape and pedicel.

Thorax: light brown, predominantly yellow pubescent; scutum medially brown, laterally dark yellow, surface entirely smooth, lightly yellow pubescent, anterior paramedial and lateral stripes densely yellow pubescent; dc setae pre- and postsuturally black, acr setae present, rarely absent; lateral scutal setae black; postpronotal lobe light brown, partly white pubescent; proepisternum, lateral postpronotum, and postpronotal lobe long black setose; scutellum lightly grey pubescent, long black setose; mesopostnotum, anatergite, and katatergite lightly yellow pubescent, mesopostnotum asetose, anatergite long black setose; supero-posterior anepisternum long black setose; posterior anepimeron long black setose; metepimeron same colour as T1, lightly silver pubescent, asetose; metepisternum silver pubescent, asetose.

Leg: brown and yellow, setation predominantly black; pro, mes, and met coxa apubescent, long black setose; met trochanter macrosetose medially; femur brown, met femur yellow; pro and mes tarsomere 1 longer than tarsomere 2, but less than combined length of tarsomeres 2–3; met tarsomere 1 as long as combined length of tarsomeres 2–3.

Wing: length = 12.8–14.2 mm; slightly brown stained throughout; halter light brown.

Abdomen: brown; setation comprised of dense short black setae; T1 brown, yellow medially, T2–7 brown with narrow dark yellow anterior and posterior margin, rarely T1–7 yellow, brown postero-laterally; T1–3 densely black setose; S1 light brown, S2–7 light brown with narrow yellow posterior margin.

Female genitalia: densely arranged anteriorly directed setae present on T7–8 and S7–8; T8 with broad anterior rectangular apodeme; T9 formed by wide, rectangular sclerite with median protuberance; T9+10 entirely fused, T10 divided into 2 heavily sclerotised acanthophorite plates, 8 acanthophorite spurs per plate; 3 spermathecae, all equally large, formed by ± expanded weakly sclerotised ducts; individual spermathecal duct long; S9 (furca) formed by 2 sclerites, separated anteriorly and posteriorly, anterior furcal apodeme present, 2 lateral projections forming divided apodeme, lateral furcal apodeme absent, median furcal bridge absent.

Material examined: Namibia: Erongo Region: 1♂ Gobabeb, 23°33'37"S 15°02'26"E, 408 m, -.-.- (holotype, SMNS); Karas Region: 1♀ Kanaän 104, 25°50'42"S 16°09'30"E, 6–7.x.1972, (AAM-003505, NMNW); 1♂ Klinghardt Mountains, 27°20'00"S 15°45'00"E, 1.x.1982, V. Whitehead (AAM-003486, SAMC); 1♂ Klinghardt Mountains, 24.x.1977, V. Whitehead (AAM-003485, SAMC); 1♂ Na-

muskluft 88, 27°48'00"S 16°52'00"E, 7–14.x.1970 (AAM-003504, SAMC); 3♀ 1♂ Rosh Pinah, 10 km NW, 27°54'00"S 16°42'00"E, 13.viii.1990, C. Roberts E. Marais (AAM-003606–AAM-003609, NMNW); **South Africa:** Northern Cape Province: 2♀ Tnong-Gys Dunes, 29°32'50"S 17°14'03"E, 23–25.ix.1988, J. Irish E. Marais (AAM-003506–AAM-003507, NMNW).

Type locality, distribution, and biodiversity hotspot: Gobabeb (23°33'37"S 15°02'26"E), Erongo, Namibia. Namibia and South Africa. Succulent Karoo biodiversity hotspot.

Remarks: Prior to this study, *P. namibiensis* was only known from the ♂ holotype collected at Gobabeb (Fig. 45). The location of new *Parectyphus* specimens in two museum collections has allowed us to describe the female for the first time and also to observe a considerable amount of colour variation among the 11 studied specimens. We dissected the ♂ terminalia from all localities, if available, to verify whether there is morphological variation in these generally species-specific features. However, we were unable to detect any differences and therefore concluded that all specimens represent *P. namibiensis* albeit coming from isolated collecting events (Fig. 45). The type locality, which marks the northern-most record, is some 700 km separated from the Tnong-Gys dunes in north-western South Africa as the southern-most record. While

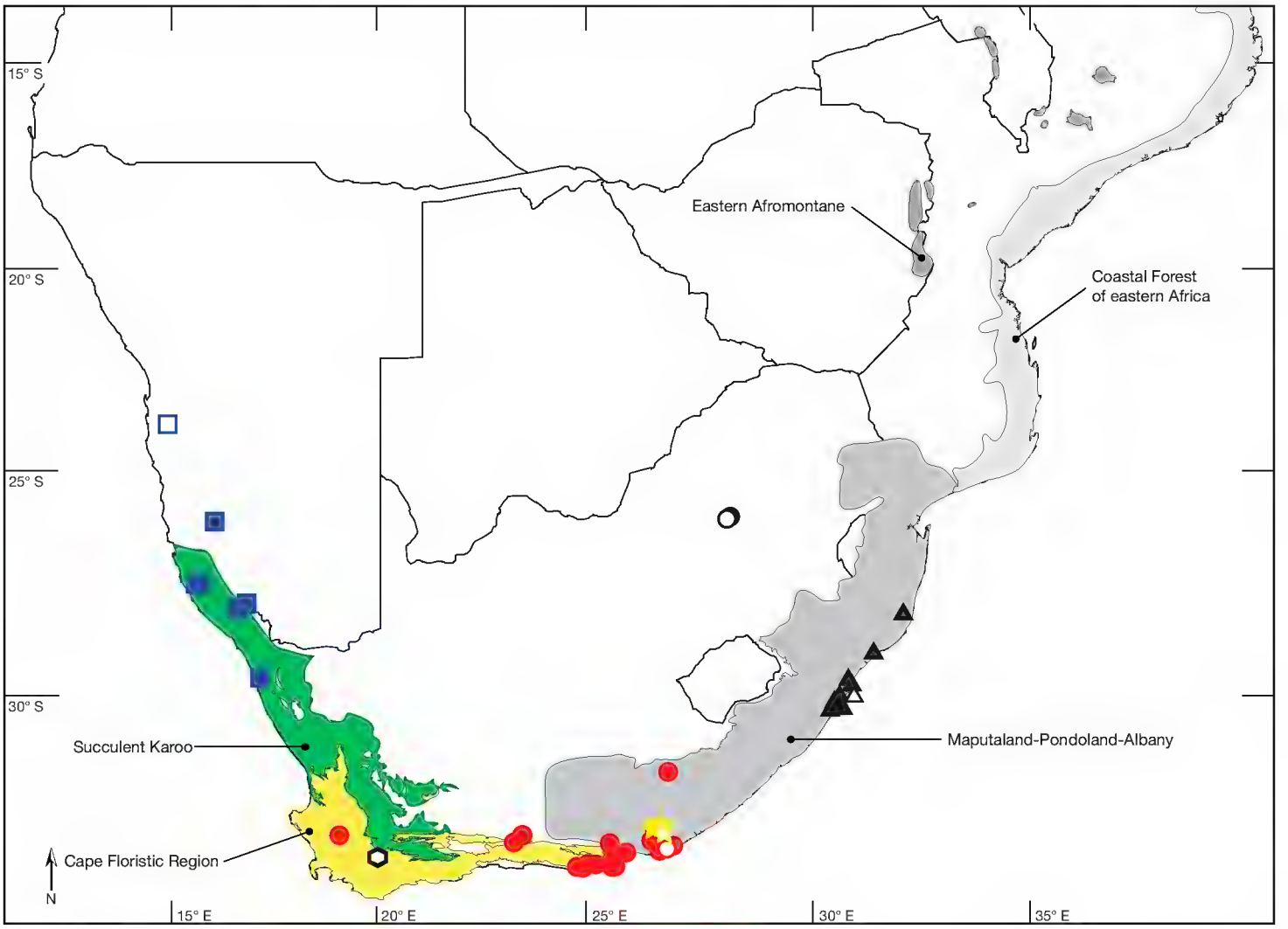


Figure 45. Map of southern Africa with biodiversity hotspots *sensu* Conservation International showing distribution of *Ectyphus abdominalis* (hexagon), *E. armipes* (triangle), *E. capillatus* (yellow star), *E. pinguis* (red circle), *E. pretoriensis* (black circle), and *Parectyphus namibiensis* (blue square). Type localities with open symbols.

the holotype is entirely white setose (Fig. 39, 42), the specimens from the Klinghardt Mountains and Namuskluft, in the centre of the currently known distribution, are yellow setose (Fig. 40–41, 43) and the specimens from Rosh Pinah and Tnong-Gys dunes in the south are black setose (Fig. 44). The pubescence pattern on the scutum is in several instances very difficult to observe and since most specimens we studied were caught in wet Malaise traps, the coloration of the entire body might also differ among populations. Although Hesse (1972) observed an absence of macrosetae on the metathoracic trochanters of the holotype, the other specimens studied by us exhibit macrosetae, which is consistent with the delimitation of Ectyphinae as having macrosetose metathoracic trochanters (e.g., Wilcox and Papavero 1971), which separates this taxon from other Mydidae taxa. As mentioned under *E. armipes*, there are three specimens of this species known from Tongaat on the KwaZulu-Natal coast of South Africa in which the particular wing venation of *Parectyphus*, namely the stump vein (R_3) entirely connecting R_2 and R_4 (Fig. 38), is also found. *P. namibiensis* exhibits other characteristics not found among *Ectyphus* species, e.g., the configuration of the male terminalia and the shape of the furca and spermathecae in the females, and therefore we do not propose to synonymise both genera. A comprehensive phylogenetic analysis of Mydidae, including all Ectyphinae, genera currently in preparation by the second author, will shed light on this question and establish whether *Ectyphus* and *Parectyphus* are adelphotaxa or whether *Parectyphus* is just an apomorphic *Ectyphus*.

Identification key to the genera and species of Ectyphinae

A dichotomous identification key to all species of *Ectyphus* and *Parectyphus* including the three remaining species from the Nearctic Region is provided below. An illustrated online version of this key can be accessed at (http://www.mydidae.tdvia.de/online_keys) and a multi-access, matrix-based key can be accessed on the same web-site. An updated, illustrated identification key to all 11 currently recognised subfamily taxa, which is based on the key by Papavero and Wilcox (1974), can also be accessed on the above web-site.

1 Metathoracic femur cylindrical, only slightly wider than prothoracic and mesothoracic femur; postpedicel bulbous in distal ½ (cylindrical in proximal ½); Nearctic **8**

– Metathoracic femur distinctly clubbed, much wider than prothoracic and mesothoracic femur (Fig. 5); postpedicel bulbous in distal ⅔ (cylindrical in proximal ⅓); Afrotropical (Fig. 1) **2**

2 Stump vein (R_3) connecting R_4 and R_2 (Fig. 38); anatergite setose (Fig. 39); supero-posterior anepisternum setose (Fig. 39); discal scutellar and apical scutellar setae present; proboscis long, projecting well beyond fronto-clypeal suture (Fig. 40); ♂ aedeagus large, laterally compressed; ♀ ovipositor with 8 acanthophorite spurs per plate ..... ***Parectyphus namibiensis*** **Hesse, 1972**

– Stump vein (R_3) extending from R_4, but not reaching R_2 (Fig. 37); anatergite asetose (Fig. 33); supero-posterior anepisternum asetose (Fig. 36); discal scutellar and apical scutellar setae usually absent, rarely laterally developed; proboscis short (Fig. 32), only in a single species projecting slightly beyond fronto-clypeal suture (Fig. 6); ♂ aedeagus rounded, with a cup-like opening; ♀ ovipositor with 11 acanthophorite spurs per plate **3**

3 Facial gibbosity yellow (Fig. 32); postpronotal lobes yellow (Fig. 34) **5**

– Facial gibbosity brown; postpronotal lobes brown (Fig. 5) **4**

4 Proboscis about ½ as long as oral cavity; labellum much shorter than prementum; parafacial area narrow, facial gibbosity nearly touching median eye margin; vertex and frons light brown setose; western South Africa (Montagu) .... ***Ectyphus abdominalis*** **Bezzi, 1924**

– Proboscis slightly longer than oral cavity (Fig. 6); labellum as long as prementum; parafacial area wide, facial gibbosity in anterior view clearly separated from median eye margin; vertex and frons white setose; eastern South Africa (along KwaZulu-Natal coast) ..... ***Ectyphus armipes*** **Bezzi, 1924**

5 T5–7 densely long white setose (Fig. 8); abdominal tergites microrugose (setae with distinct sockets, especially where brown coloured) .... ***Ectyphus capillatus*** **Hesse, 1969**

– T5–7 sparsely short white setose (Fig. 4); abdominal tergites entirely smooth **6**

6 Katatergite yellow; legs yellow to light brown (Fig. 4); T1–7 with entire yellow posterior margins (Figs 3–4); eastern Africa (Kenya).... ***Ectyphus amboseli*** **sp. n.**

– Katatergite brown (Fig. 9); legs primarily brown (Fig. 9); T1–7 at least medially with brown posterior margin (some specimens with narrow yellow posterior margins, Fig. 31); South Africa..... **7**

7 Metepimeron yellow (in stark contrast to brown T1, Fig. 32); ♂ palp-like lateral gonocoxal appendage situated sub-apically (Fig. 20); ♂ and ♀ abdominal tergites with broad yellow latero-posterior margins (sometimes yellow margins occupy latero-posterior ½ of tergite, Figs 31, 33); south to south-western South Africa (Eastern and Western Cape, Fig. 45) .... ***Ectyphus pinguis*** **Gerstaecker 1868**

– Metepimeron brown (same colour as T1, Fig. 9); ♂ palp-like lateral gonocoxal appendage situated apically (Fig. 23); ♂ and ♀ abdominal tergites with very narrow yellow latero-posterior margins (Figs 9–10); north-eastern South Africa (Gauteng, Fig. 45) ..... ***Ectyphus pretoriensis*** **(Bezzi, 1924)**

8 Anepisternum and katepisternum partly grey pubescent (not obvious to naked eye); R_5 terminates in C (cell r_4 open), sometimes in R_1 very close to C; apical metathoracic tibial spine present in ♂ and ♀; ♂ hypandrium partially fused to gonocoxite; ♂ palp-like lateral gonocoxal appendage absent .... ***Heteromydas bicolor*** **Hardy, 1944**

– Dorsal anepisternum and dorsal katepisternum distinctly white pubescent (visible to naked eye); R_5 terminates in R_1 (cell r_4 closed); apical metathoracic

tibial spine present in ♂, absent or very much reduced in ♀; ♂ hypandrium completely free from gonocoxite; ♂ palp-like lateral gonocoxal appendage present **9**

9 Supero-posterior anepisternum with only few white setae; bulbous (distal) part of postpedicel sub-equal to or longer than cylindrical (proximal) part; thorax generally yellow to light brown; ♂ abdominal tergites lightly grey pubescent; for ♂ terminalia see Kondratieff and Fitzgerald 1996 ..... ***Opomydas limbatus*** **Williston, 1886**

– Supero-posterior anepisternum densely long white setose; bulbous (distal) part of postpedicel shorter than cylindrical (proximal) part; thorax generally dark brown; ♂ abdominal tergites apubescent; for ♂ terminalia see Kondratieff and Fitzgerald 1996 ..... ***Opomydas townsendi*** **Williston, 1898**

Discussion

Biology and ecology

The family Mydidae is most often collected in arid to semi-arid areas, and *Ectyphus* and *Parectyphus* are not exceptional. Hesse described the then known habitats as "scrub- and sclerophyll-covered dunes" (1969: 372) and "semi-wooded and forested parts" (1972: 165) of southern Africa. Even in the Namib Desert, the holotype of *Parectyphus namibiensis* was probably collected from a "wooded environment ... namely that found along the banks of the Kuiseb River" (Hesse 1972: 165). The new collecting localities for *P. namibiensis* (Fig. 45) occur inland, but sand dunes or at least dry, sandy river beds are present. Several species of *Ectyphus* have been collected at river mouths with presumably larger amounts of open sand, *i.e.*, Gamtoos River near Papiesfontein, Riet River in Port Alfred, Van Staden's River, and possibly the Tongaat River. According to Hesse (1969) *Ectyphus* is often collected resting on the ground or sand in open spaces. Although the life history of species of Ectyphinae has not been observed, behavioural characteristics are probably similar to other Mydidae. All species appear to have functional mouthparts, although these can be short as in *E. abdominalis*, *E. amboseli*, *E. capillatus*, *E. pinguis*, and *E. pretoriensis*, and so probably visit flowers and feed on pollen and nectar. The larvae of *Ectyphus* and *Parectyphus* remain unknown.

Seasonal incidence

Ectyphus: abdominalis: January; *amboseli* sp. n.: September; *armipes*: November–April, July, September; *capillatus*: December–January; *pinguis*: November–February; *pretoriensis*: September; *Parectyphus: namibiensis*: August–October. While *E. armipes* ap-

pears to fly for much of the year along the KwaZulu-Natal coast, *E. abdominalis*, *E. capillatus*, and *E. pinguis* appear only during the southern Hemisphere summer and both, *E. pretoriensis* and *P. namibiensis*, fly only in spring.

Biodiversity hotspots

Areas of high plant endemism, which are under serious threat of destruction and which have already sustained loss of biodiversity, are referred to as biodiversity hotspots by Conservation International (http://www.conservation.org) (Myers et al. 2000). The presence or absence of Mydidae species in designated biodiversity hotspots is an indication of whether these species will be protected when funding for the preservation of the hotspots is made available. *Ectyphus armipes* and *E. capillatus* are endemic to the Maputaland-Pondoland-Albany hotspot. *Ectyphus pinguis* is found in both Maputaland-Pondoland-Albany and the Cape Floristic Region, as well as slightly outside of both of these hotspots. *Ectyphus abdominalis* is endemic to the Cape Floristic Region. Parts of the range of *Parectyphus namibiensis* are in the Succulent Karoo hotspot. *Ectyphus amboseli* sp. n. was collected just outside the boundaries of the Eastern Afromontane hotspot, but further collection efforts in localities with higher elevations may result in *E. amboseli* specimens from this patchy biodiversity hotspot. The majority of species and specimens studied occur or are endemic to biodiversity hotspots *sensu* Conservation International. However, two species, *E. amboseli* sp. n. and *E. pretoriensis*, do not occur in any biodiversity hotspot.

Conclusion

The description of *Ectyphus amboseli* sp. n. expands the distribution of Afrotropical Ectyphinae by presenting a Kenyan species far from all other known species in southern Africa. This distribution does also have implications for the discussion of the phylogenetic relationships of Ectyphinae to other Mydidae, which are being further investigated by the second author (in prep.). In addition to the previously known distribution in southern Africa and western North America, Ectyphinae are now also known from eastern Africa. A similar distribution with a western North American element and a primarily southern African element within the Afrotropical Region is also found within the Willistonininae of the Asilidae (Dikow 2009). Within Willistonininae, the genus *Sisyrnodytes* Loew, 1856 even occurs in the southern Palaearctic Region, but the highest species diversity is found in southern Africa (see Londt 2009). We predict that additional records of *Ectyphus*, or possibly even undescribed species, will become available with more field work along the eastern African coast and especially in Mozambique and Tanzania, both poorly collected areas.

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